
# DOE-EERE Workshop on Renewable Energy Certificate (REC) Markets and Challenges – September 11, 2007

## Workshop Summary

### Background

The U.S. Department of Energy's (DOE) Office of Energy Efficiency and Renewable Energy (EERE) sponsored a one-day workshop for a diverse group of renewable energy certificate (REC) market participants and policy thought leaders on September 11, 2007. In doing so, DOE hopes to foster broad and liquid REC markets and to maximize investment in renewables.

Approximately 65 individuals (see participant list in Appendix A) representing state and federal government agencies, renewable energy project developers, REC tracking systems, brokers, marketers, financiers, and other stakeholders gathered in Washington, D.C. At the workshop, participants exchanged views on lessons learned from REC market implementation; factors that constrain REC markets; the potential value of harmonizing/standardizing REC trading between tracking systems, and key activities and appropriate players needed to increase the liquidity of REC markets. See Appendix B for the full agenda.

In direct response to the workshop recommendations, DOE will seek to support a number of activities to encourage increased liquidity and harmonization in RECs markets, which are detailed on page 5.

### Overview of the Workshop

Steven Chalk (DOE-EERE) opened the meeting by expressing DOE's commitment to work with and facilitate the work of the private sector and the not-for-profit community in supporting robust REC markets. Jennifer Owens provided an overview of the federal legislation that might impact REC markets including the possibility of a national Renewable Portfolio Standard (RPS).

The first plenary session laid the foundation for the rest of the day. Andrew Kolchins (Evolution Markets) provided an overview of the notable differences in the regional voluntary and mandatory REC markets, including RPS policies, REC prices, and REC market liquidity. He emphasized that long-term commitments can help to reduce uncertainty and help build stronger forward price curves for RECs. Next, Jennifer DeCesaro (CESA) detailed her activities working with RPS administrators in the northeast to facilitate discussions about greater standardization of RPS eligibility. Although politically challenging, she argued that a national dialogue on RPS harmonization is needed. Finally, Meredith Wingate (CRS) rated the effectiveness of current REC verification and tracking systems. Meredith believes that tracking systems are doing well on functionality (issuing, verifying and tracking RECs within each system), not quite as good on their flexibility (banking, verifying deliverability and DG, and trading RECs between tracking systems), and that they could improve on verifying and tracking attributes between REC and GHG tracking systems (importing/exporting and preventing double-counting). She noted that the North American Association of Issuing Bodies could help execute the improvements.

Two panels of experts were asked to identify critical issues with increasing REC market liquidity associated with (a) REC revenues, price transparency and project financing, (b) harmonizing REC tracking systems, (c) key RPS design elements and (d) standardizing RPS policies. Notes from the morning sessions, including the list of panelists and questions and answers can be found in Appendix C.

In the afternoon, the participants broke into two sessions to continue the conversation on issues and to identify specific actions that could improve the scope and efficiency of REC markets, both by DOE and other actors. Details from both breakout sessions are in Appendix D – and the highlights are captured below.

**Identified Barriers and Recurrent Themes**

The following key barriers and themes[1] emerged from the panelists' exchanges and the discussion during subsequent breakout sessions, often more than once:

- Workable regional and national REC markets can be created without a national RPS policy, but there are currently a number of impediments that prevent greater exchange of RECs across states and between regions.
- Narrowing the differences between state RPS eligibility and deliverability requirements would be politically challenging since these requirements have grown out of specific state objectives.
- For that reason, an initial emphasis on harmonizing REC tracking systems seems like it would be most beneficial.
- Tracking systems have the technical capability to accommodate inter-regional trading. They are not currently configured to facilitate multi-regional transactions, because they primarily were designed to track and verify RECs for state RPS requirements within their region.
- To make RECs function as a commodity that can be traded, RECs in every system would need to track all characteristics and benefits. Therefore, REC tracking systems should have comprehensive information that includes all the data needed in all voluntary and compliance markets to facilitate the possibility of inter-regional trading.
- Uncertainty of RPS regulatory policies and voluntary market demand leads to uncertainty about future price of RECs. This makes long-term contracts and long-term forward markets for RECs less attractive and undermines the ability to use future REC revenue streams to leverage project financing. As a result, in some parts of the country, REC prices are too low, particularly over the long-term, to support new renewable project development.
- Tracking and verification systems do not track the level of disaggregation of renewable energy characteristics, particularly emissions, because it is not required by state RPS policies. In addition, the development of carbon offset markets and GHG cap and trade systems increases the urgency of developing widely accepted protocols for determining the value and tracking the characteristics of unbundled RECs. Some states and voluntary

[1] While most of these themes were mentioned more than once and were perhaps agreed upon by several participants, neither the facilitators nor DOE attempted to reach consensus on any of them.

programs prohibit disaggregation of the renewable energy benefits; other states and programs have let the markets determine the value of disaggregated RECs.

- Currently, some portions of the country are not covered by RECs tracking systems, although some market participants pointed out that soon there will be a pay-for-participation "default" REC system available.
- Another area that might have a high payoff, in terms of increasing the liquidity of RECs trading platforms, would be to work with states developing new RPS programs to identify provisions which would allow for interstate and interregional trading.

**Areas for further discussion**

In some cases, the participants did not agree on the most pressing problems or the solutions. It was clear that further discussion on the following issues is needed to determine next steps:

- What is the goal of RPS harmonization? To lower prices? To increase transactions? How will harmonization affect other goals such as maximizing local economic development and emissions reduction benefits? Is there a way to standardize RPS polices which will allow states to achieve their goals while improving liquidity in the markets?
- Is REC price uncertainty inevitable or necessarily harmful? Price uncertainty is accounted for through price discounts of future year RECs. Does this accurately reflect the risk in the market?
- Short-term REC price transparency (and history of REC prices) exists in some markets and could be helpful as long as project-specific confidentiality is protected; long-term REC price transparency is even more important and not as prevalent. Is this a problem or will price transparency develop on its own?

**Suggestions for DOE action**

The majority of the breakout session discussion focused on activities DOE and others should undertake to overcome the impediments to broader and more liquid REC markets. Below is a list of suggestions generated by the Workshop participants. Note that these suggestions do not represent consensus recommendations.

DOE could:

- **Promote multi-party dialogue** on:
    1. seams issues[2] between regional tracking systems
    2. national tracking system for voluntary markets
    3. standard protocols for verification of generator and REC characteristics
    4. interactions between REC and GHG markets

[2] Seams issues are cross-boundary issues that exist because two tracking systems may not track, record or verify the same information over the same period of time, and there is therefore a question about how to import/export RECs between tracking systems.

5. the value and method for increasing short-term and long-term price transparency
6. standardizing RPS REC definitions

- **Educate**:
    7. Evaluate and disseminate best practices of state RPS policies and regional market systems. Facilitate peer exchange between states with RPS policies and states considering RPS policies.
    8. Increase credibility of the REC markets to generate greater demand and provide greater confidence among financiers and the investment community. (e.g. DOE should make it better known that the agency is a large purchaser of RECs)
    9. Work with public power entities (municipal utilities and electric cooperatives) to promote voluntary renewable programs, since most are not parts of state RPS policies

- **Gather and disseminate data**:
    10. Provide market information (carbon prices, renewable technology costs, technology standards, resource assessment, REC prices)
- **Support development of national standards through collaboration with stakeholders for**:
    11. Qualify or identify a reasonable baseline or set of requirements, above which projects have a much higher likelihood of getting built, for states, end-users and the financial community. New projects under development can range from "paper projects" that will never be built, to solid proposals that are backed by experienced developers. Technical assistance from DOE to weed out the losers would be appreciated.
    12. Establish an on-line national generator verification system. Audit a random subset of generators to ensure that REC characteristics are accurate and to verify project performance (particularly biomass projects with the potential to fuel switch).
    13. Standard REC products (what characteristics should be included in all RECs?) and REC contracts
- **Provide Technical assistance and R&D:**
    14. Support technical assistance to states/regions (1) considering RPS and/or REC tracking systems (2) wanting to improve RPS and/or REC tracking systems
    15. Support basic R&D on renewable energy technologies

**Suggestions for other activities** also emerged which may involve other federal agencies, states, or private sector and non-governmental actors:

- Operate a central auction for RECs to increase visibility and liquidity in the REC markets; set a national price floor for RECs
- Provide funding for enhancements to tracking systems to accommodate a national standard
- Create mechanisms to increase current and future REC price transparency
- Establish a dialogue about the impact on current REC tracking systems and current state-level RPS policies that could result from a national RPS
- Provide funding for audits or spot checking to implement more rigorous verification
- Create a separate system for tracking and verifying renewable energy benefits such as emission reductions
- Provide back-stop siting authority for renewable energy projects

**Potential Workshop Follow-on for DOE**

DOE EERE found the comments, insights and recommendations from the RECs workshop participants highly instructive. As a direct result, DOE EERE will seek to support the following activities:

1. **Seed Funding for National Dialogue on Tracking System Harmonization.** DOE is providing funding to help launch the North American Association of Issuing Bodies (NAAIB), to discuss seams issues between tracking systems.

2. **Fund National Dialogue on RPS Standardization.** The Clean Energy States Alliance (CESA) is working in the northeast to provide a forum for states to engage in information sharing, to work on common implementation issues, and to explore the harmonization of individual state RPS markets with larger renewable energy markets. DOE commits to fund CESA so that this effort can be expanded to a national level.

3. **Hold Additional Discussions.** DOE clearly heard that additional discussions on REC-related topics are important (e.g. carbon which would be done with EPA). Therefore, DOE intends to sponsor additional workshops on topics important to increase REC market liquidity.

4. **Gather and Disseminate Data.** DOE is continuing to fund NREL and LBNL analytical efforts, to provide the market with information and analysis of key REC market issues.

5. **Continue to Provide Technical Assistance**. Technical assistance will be provided to states through (1) State Energy Activities Request for Proposals on Renewable Energy Portfolios and Renewable Energy Certificates and (2) the Technical Assistance Program,

6. **Evaluate Additional Opportunities.** DOE will consider the workshop participant recommendations for educational activities and national standards in light of the full range of DOE EERE priorities.

# Appendix A. List of Workshop Participants

Rick Anderson
FPL Energy Power Marketing

John Atcheson
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

Brent Beerley
IBERDROLA

Howard Bernstein
Massachusetts Division of Energy Resources

Lori Bird
National Renewable Energy Laboratory

Dan Birns
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

Leslie Black Cordes
U.S. Environmental Protection Agency

Jeff Bladen
PJM – EIS

Claude Boudrias
American Public Power Association

Claire Broido Johnson
SunEdison

Steve Chalk
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

Matt Clouse
U.S. Environmental Protection Agency

Andrea Coon
Western Region Electricity Generation Information System

Karlynn Cory
National Renewable Energy Laboratory

Carrie Cullen-Hitt
Constellation NewEnergy

Jennifer DeCesaro
Clean Energy States Alliance

Jeff Deyette
Union of Concerned Scientists

Nike Dietsch
U.S. Environmental Protection Agency

Paul Douglas
California Public Utility Commission

Rachel Dugan
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy

Dennis Duffy
EMI Energy and NEPOOL Generation Information System

Rob Edwards
Hunton & Williams

Robert C. Grace
Sustainable Energy Advantage

Paul Helgeson
Wisconsin Public Service Commission and Midwest Renewable Energy Tracking System

Scott Hennessey
Solar Energy Industry Association

Ed Holt
Holt and Associates

Charles Jennings
Solar Energy Technology Program
U.S. Department of Energy

Mel Jones
Sterling Planet

Sara Kamins
California Public Utilities Commission

Kevin Kelly
Federal Energy Regulatory Commission

Miles Keogh
National Association of Regulatory Utility Commissioners

# Appendix A. List of Workshop Participants (cont.)

Joe Kerecman
APX, Inc.

Andrew Kolchins
Evolution Markets

Steve Lindenburg
Wind & Hydropower Technologies Program
U.S. Department of Energy

Randy Manion
Western Area Power Administration

Larry Mansueti
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy

Rick Morgan
District of Columbia Public Service Commission

Chris Namovicz
Energy Information Administration
U.S. Department of Energy

Hampton Newsome
Federal Trade Commission

Jennifer Owen
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

John Pappas
Pacific Gas and Electric Company

Joe Parella
New York State Public Service Commission

Alexander Perera
World Resources Institute

Carrie Plemons
PPM Energy

Kevin Porter
Exeter Associates

Kevin Rackstraw
Clippler Windpower

Tom Rawls
THR Associates and Alliance for Retail Choice

Brian Rounds
South Dakota Public Utilities Commission

Liz Salerno
American Wind Energy Association

Jim Scarrow
Chadbourne & Parke

Linda Silverman
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

Elaine Sison-Lebrilla
Sacramento Municipal Utility District

John Sniffen
Element Markets

Andrew Spahn
National Council on Electricity Policy

Ian Springsteel
Massachusetts Technology Collaborative

Jim Torpey
SunPower Corporation

Devon Walton
APX

Sam Watson
North Carolina Utilities Commission

Jeremey Weinstein
Environmental Markets Association

Meredith Wingate
Center for Resource Solutions

Ryan Wiser
Lawrence Berkeley National Laboratory

Johanna Zetterberg
Office of Energy Efficiency and Renewable Energy
U.S. Department of Energy

Catherine Morris
Jeremy Kranowitz
Beth Fascitelli
The Keystone Center - facilitators

# Appendix B. RECs Workshop Agenda

## Workshop on Renewable Energy Certificate (REC) Markets and Challenges

Renaissance Washington Hotel, Washington, DC
999 Ninth Street NW – Gallery Place/Chinatown Metro Stop
September 11, 2007

8:00 Registration and Continental Breakfast

8:30 Opening Remarks
*Steven Chalk, Deputy Assistant Secretary for Renewable Energy – U.S. Department of Energy*
*Jennifer Owen, Legislative Affairs Advisor - U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy*

9:00 The RECs Market and Policy Context
Moderator, Lori Bird, National Renewable Energy Laboratory

Overview of RECs Markets and Prices
*Andrew Kolchins, Evolution Markets*

Working with the States to Address RPS/RECs Issues
*Jennifer DeCesaro, Clean Energy States Alliance*

Status Report on REC Verification, Tracking Systems and Associated Issues
*Meredith Wingate, Center for Resource Solutions*

10:00 Break

10:15 Discussion Panel on REC Markets, Prices, Trading, and Liquidity
Moderator, Karlynn Cory, National Renewable Energy Laboratory
*Brent Beerley, IBERDROLA* – Marketer Perspective
*Carrie Cullen-Hitt, Constellation NewEnergy* – Retailer Perspective
*Carrie Plemons, PPM Energy* – Generator Perspective
*John Pappas, PG&E* – Purchaser Perspective
*Jim Scarrow, Chadbourne & Parke* – Financier Perspective

11:15 Discussions Panel on RPS Policies and Supporting Infrastructure
Moderator, Ryan Wiser, Lawrence Berkeley National Laboratory
*Paul Douglas, California Public Utilities Commission*
*Paul Helgeson, Wisconsin Public Service Commission*
*Rick Morgan, District of Columbia Public Service Commission*
*Devon Walton, APX*
*Jeff Bladen, PJM-EIS*

12:15 Sign up for Afternoon Breakout Sessions

12:20 Lunch

1:30 Facilitated Discussion of Key Issues and Market Needs

**Concurrent breakout sessions**
Breakout session #1: Using RECs for Project Financing
Breakout session #2: Harmonizing REC Programs and Tracking Systems to Facilitate Regional/National Markets

*Detailed topics for each breakout are provided separately*

**Facilitated by:**
*Catherine Morris, Beth Fascitelli & Jeremy Kranowitz, the Keystone Center*

3:30 Break

3:45 Reports on Facilitated Discussion

4:15 Summation/Next Steps
*Catherine Morris, the Keystone Center*
*John Atcheson, Weatherization and Intergovernmental Program - U.S. Department of Energy's Office of Energy Efficiency and Renewable Energy*

4:30 Adjourn

# Appendix C. Morning Plenary Session Summary

## OPENING SESSION

**Deputy Assistant Secretary of DOE EERE Steven Chalk** opened the meeting by expressing DOE's commitment to work with and facilitate the work of the private sector and the not-for-profit community in supporting robust REC markets. DOE has undertaken a number of activities already including:

- Providing technical assistance to states and communities pursuing RPS, REC trading;
- Conducting foundational analysis on REC markets and trading (e.g. Green Power market analysis, Green Power Network website, National Renewable Energy Marketing Conference); and
- Releasing a state Solicitation (posted in July '07) that is designed to leverage and support state and regional activities to explore the necessary conditions for increasing the liquidity of RECs trading.

**Jennifer Owens of DOE EERE,** provided an overview of the federal legislation that might impact REC markets including the possibility of a national Renewable Portfolio Standard (RPS). She was pessimistic about the possibility of a comprehensive energy bill in the remaining 110th Congressional session, in part because of the wide divergence between the House and Senate Energy bills currently under consideration

## PLENARY PRESENTATIONS

Three plenary speakers provided the background for the day's discussion (see a copy of the speakers presentations in Appendix B):

**Andrew Kolchins, Director of Renewable Energy Markets, Evolution Markets**

Andrew provided the perspective of a REC broker on the challenges of achieving liquidity, efficiency and transparency in REC markets. He emphasized the wide variation between states' RPS policies (eligibility, deliverability and level of demand) and REC prices. He also characterized the differences between mandatory RPS or compliance markets, and voluntary markets. Although RECs can play an important role in securing financing for renewable projects, Andrew explained the need for longer-term RPS policies to build stronger forward price curves for RECs. Future REC prices are typically discounted because of uncertainty, according to Kolchins, and the interaction between REC markets and carbon offsets is still unclear.

**Jennifer DeCesaro, Project Director, Clean Energy States Alliance (CESA)**

CESA is working with a group of states that have implemented Clean Energy Funds. CESA is currently reviewing RPS administration and voluntary markets for lessons learned, common implementation issues, and opportunities for cooperation. Jennifer explained that CESA is helping states with RPS policies to find areas for greater standardization to broaden REC markets. Like Andrew, she pointed to differences in state eligibility, deliverability, location and hourly scheduling requirements as the main impediments to liquid regional or national REC markets. Although it would be politically challenging, Jennifer argued that there would be a lot of value in DOE support continued dialogue among the states on how to create a more unified REC definition, across the entire U.S.

**Meredith Wingate, Director of Clean Energy Policy Design and Implementation Program, Center for Resource Solutions (CRS)**
Meredith provided a report on the status of current REC verification and tracking systems, rating most REC tracking system as good at verifying actual generation and preventing double counting, but less successful at providing transparency about the level of disaggregation of RECs or at allowing coordination between tracking systems and GHG programs. As one avenue for addressing the lack of coordination, she described the formation of the North American Association of Issuing Bodies (NAAIB), a forum for tracking system operators and regulators to discuss how to achieve common interests. She urged DOE to help regions develop more consistent standards for verification of generation characteristics, including more timely and comprehensive information through the Energy Information Administration (EIA).

## PANEL DISCUSSIONS

Two panel discussions highlighted some of the key challenges with improving REC market liquidity and harmonization. Each focused on a set of questions detailed below:

**PANEL 1 – Moderator** Karlynn Cory, NREL
**Panelists:** Brent Beerley, IBERDROLA
Carrie Cullen-Hitt, Constellation NewEnergy
Carrie Plemons, PPM Energy
John Pappas, PG&E
Jim Scarrow, Chadbourne & Parke

***Q. Where do RECs have the greatest value today? What factors drive differences in value? Do you expect this to change over time?***

- Pappas – scarcity; penalties and price of ACP; flexible compliance can smooth out demand curves; standardize products between states to create a commodity market to stabilize and lower price.

- Scarrow- as financier, I think about long-term prices; regulatory uncertainty is the biggest problem e.g. federal legislation and state changes like CT has experienced.

- Cullen-Hitt –voluntary market prices vary by customer preference for technology, location, and fuel type; most people focus on uncertainty in RPS policy, but in voluntary market, we are concerned about how voluntary market will fit in GHG markets.

- Plemons – highest price is not necessarily where RECs are most highly valued over the long run
- Beerley – important to look at both voluntary and compliance markets eg. PJM underestimated amount of RECS that were available because they didn't consider both; markets should be additive, not duplicative.

- ***Q. How important are prospective REC revenue streams to project finance decisions? How certain are these revenue streams? What are the key market risks? How can REC revenues play a greater role in project finance? What governmental actions, at the state or federal level, might facilitate this?***

- Beerley – IBERDROLA is involved in development of wind farms in east. But for REC values, project financing decision would have been a "no go." As confidence in REC market grows, there will be more merchant decisions on projects; certainty in state policy important.

- Investment decision where there is no forward market in RECs, i.e. zero value in RECs; the return will be below cost of capital. Most projects on balance sheet of IBERDROLA (equity financed). Firm is taking a lot of the risk. Seeing a discount on future REC values now. $15 -$20 REC value over the long-term can bring the ROR high enough.

- Scarrow – different experience; only a couple of projects financed off REC revenue stream; power purchase agreement more important; banks give little credit to REC value. Exception – NY; projects require REC where state uses system benefit fund to make purchase.

- Cullen-Hitt – more important issue is inability to site facility. As counter party, we're willing to do transactions with credit worthy entities not so much merchant developers with lower credit rating.

- Plemons – not as concerned about the credit worthiness. More concerned about credit impacts on the production chain for RE projects; little guys are already constrained and credit crunch will create crunch in supply chain.

- Scarrow – seen no impacts on RE projects of REC markets. Most are tax equity deals. Construction loan financing and investors on completion of project are people who want to take advantage of tax credits. Seen no slow down yet.

- ***Q. From your perspective, would the market benefit from increased REC price transparency and/or from the development of forward REC price curves? If so, how might this be accomplished?***

- Pappas – Market would benefit from price transparency, but not an immediate need. Transparency is a by-product of a well-functioning market; don't see a need for a government agency to facilitate. Most transactions are on bilateral basis because the products are not consistent; as products become more consistent, more spot market transparency and volume will emerge. Price transparency is an effect of a well-functioning market not the cause.

- Cullen-Hitt - Agree. It is going to happen sooner than you think

- Plemons – Quite a way to go in the definition of the product. Could have basis adjustments off the clear definition of the REC product for more liquidity and transparency.

- Scarrow – lenders only lend on the basis of what is transparent to them, and they see more than the market shares unless deal relies on the spot market.

- Beerley – better for DOE to attack from different angle; work on seams issues; standardization among tracking system to create better definitions and standardization.

***Q. From your perspective, would the market benefit from increased consistency in the definition and trading of RECs? If so, what elements of REC definitions are most critical (e.g., banking periods, treatment of emissions allowances, resource eligibility)? Should***

***the federal government seek to have one single REC tracking system that operates nationwide?***

- Pappas – resource eligibility including location; treatment of emission allowances; banking period NOT that important.

- Cullen-Hitt – from wholesale market perspective, the definition may be different. Retail market is driven by what consumers want. Coordination between systems would be helpful; Can you show the buyer the attestation to verify attributes? Could be confidentiality problems.

- Audience (NEPOOL GIS) – Re. is a national tracking system consistent with the state policy? Tracking systems can respond to any rule changes. Are you talking about a system that tracks both RECS and electricity? Or just REC tracking? NEPOOL uses it for consumer disclosure as well. Can a national tracking system deliver what the states need? If not states will need to create a duplicative system.

- Plemons – consistency with the data on RECs nationally would be useful, then each state can apply whatever constraints on eligibility they wish (check the appropriate boxes for that REC).

- Pappas – don't need national standard, just coordination of regional standards. Address seams issues; but tracking systems could merge down the road. Tracking administrators have to deal with the generators and compliance entities. National system could be too onerous

- Beerley – agree that we don't need national system, just coordination. Role for DOE - eliminate double counting threats and seams issues will go away. Demand may be there now to see separate regions to equilibrate prices. Beginning to see it in NE. DOE could help with infrastructure.

- Audience (NEPOOL GIS) – no tracking technology limits tracking systems from talking to each other; limits are only the State policies.

- Cullen-Hitt – growing voluntary market needs support on consistency and verification too.

***Q. We've heard a lot about how the different state rules for RPS eligibility and implementation, as well as the risk of policy changes, create uncertainty regarding long-term RECs prices and thus the ability to ascribe a value to RECs in project finance decisions. Do you view this as a problem, and if so, what changes would provide for greater market stability?***

- Pappas – as long as existing projects are grandfathered, changes do not impact projects.

- Scarrow – sometimes the rules need to change in a nascent market; but it puts buyers at risk; federal RPS proposals wouldn't preempt states, but would states want to incur the costs of maintaining state systems with a national system alongside; uncertainty is going to be there for awhile.

- Beerley – don't do anything at all to nationalize RPS policies; instead look at more comprehensive renewable policies like siting. MA has stayed put on RPS even though

prices have been high, but siting is a problem. TX has been helping the renewable projects with permitting and with transmission.

- Cullen-Hitt – the more you tinker and get prescriptive, the higher the risks in the market because policies may be the wrong ones.

- Kolchins – legislators and regulators uncertainty can be addressed in the market by discounting or some other hedge against the markets. States are not willing to learn from others.

- Audience (NY regulator) – changes have made the program better; RPS is evolving and can't get it right out of the box. NY is trying to make it the best for all the constituencies they serve.

**PANEL 2 – Moderator** Ryan Wiser
Panelists: Paul Douglas, California Public Utilities Commission
Paul Helgeson, Wisconsin Public Service Commission
Rick Morgan, DC Public Service Commission
Devon Walton, APX
Jeff Bladen, PJM-EIS

***Q. Each state has developed its own approaches to establishing its RPS policy, and many design differences are therefore apparent across states. To what extent has this been a concern expressed in your state? What is the nature of the concerns that have been expressed?***

- Helgeson – represents both PSC and MRETS board. Biggest problem in WI is that the REC is established at the point of retail sales to make a connection between state and utilities; hope to change this. MRETS is intended to be policy neutral and functional across states.

- Walton – PJM had functionality for multi-state approaches.

- Douglas – no REC trading platform in CA; bundled market; policy is designed to promote economic development and RE projects within state; fairly strict deliverability requirement so WREGIS has to track deliverability of electricity. Just starting to talk about REC markets in CA.

- Bladen – In PJM, REC is not a natural commodity because of differences between states; Fannie Mae is best example of the state's ability to play a role here; government should devise a national standard to trade on national platform, e.g dollar as the international conversion mechanism – need a conversion mechanism between TX RECs and MA RECs

- Morgan - DC RPS just started. Voluntary market must be additional to have meaning and its explicit in rules. DC hasn't done end of year reconciliation so difficult to evaluate; DC unique because it imports 98% of electricity from outside and the same will apply to RECs. Can import from as far as WI, AR, and AL.

***Q. It is (theoretically) possible that state RPS designs might become more uniform or harmonized over time, either nationally or regionally. What design elements are most important to standardize from the perspective of liquidity? How plausible do you think it***

***is to gain additional standardization on any of these matters, and what processes may yield such harmonization? What are the substantive risks to further harmonization?***

- Douglas – CA: Demand exceeds supply and deliverability constraints put a great constraint on RECS; WECC – Wide eligibility rules. Mandated by statute so need changes in legislation, which would be difficult.

- Morgan – Harmonization is different from unity. Could have different rules about eligibility and still be harmonized, can have diversity and still have a more uniform trading system.

- Bladen – Do we want RECs to be convertible between states; then what does the conversion look like? Don't need uniformity, harmonization is desire for convertibility.

- Helgeson – Agree with the distinction; in MRETS, we deal with harmonization by requiring the same data.

- Audience: Could TX accept NJ REC at a discount if it isn't the same eligibility?

- Bladen – Right now there is an artificial price inflation because REC is not a commodity. The best way to create a commodity is to make it easily convertible. Regulators should think about whether they are getting the lowest cost commodity. Could create a public entity for setting up a national standard (e.g. Fannie Mae mortgages) which gives the states the choice to buy and sell into the national standard.

- Morgan – if convertibility requires legislation, it will be difficult; where emission allowances are awarded for RE; they are separately bought and sold in separate market; emission allowances in general are not provided to RE; but emission attributes are different (ie for voluntary disclosure)

***Q. What functionality is required in tracking system to track fate of emission allowances either integral to or separated from RECs?***

- Helgeson – WI still kicking around whether allowances can be valued in the REC, but all RECs need to maintain their emission attributes to be valued.

- Bladen – can be done; not there yet. Would find it troubling if environmental attributes were stripped out.

- Helgeson – how do you define environmental attributes? Defined in terms of state-only benefits or more globally?

- Audience – Are states recognizing a standard product? Market best served if government works toward standard definition versus conversion system. Any other path leads to the need for federal preemption.

- Bladen – That doesn't pass political reality test or economic theory. Five uniform standards are less efficient than having one.

- Audience - Who considers emission allowances an environmental attribute?

- Douglas – CA trying to find out what the GHG attributes mean for REC system.

- Morgan – could make the argument that an allowance should be included with REC but how do you enforce system? Is it more a theoretical question than really an issue? Cost of allowances is built into the price of electricity already.

***Q. Tracking systems have been designed to meet RPS but not the larger renewable markets particularly the voluntary markets; what is needed to change this?***

- Walton – need to be able to track deliverability and geography in the same way across tracking systems.

- Bladen- it is all about whether the consumer has assurance that they are getting what they want.

- Audience (consultant) – depends on whether the seller or the buyer are comfortable with just the fact that the REC has been retired or that it is sold or developed in a certain region.

- Audience (REC marketer) - RPS accounting systems exist to create credibility to RECs; in some parts of the country, RECS have less credibility because of potential double counting. Credibility could be supported by transparency.

- Bladen- cost implications with degree of fungibility;

- Audience - Environmental attributes are regional – depends on what the regional marginal supply profile looks like. (i.e. what power is being offset)

- Audience (CRS) – going to require that all RECs flow through the tracking system that meets a minimum level of verification of generator characteristics.

***Q. To what extent do existing or in-development state and/or regional RECs tracking systems help with RPS compliance? Do you see any limitations in the way in which these systems are currently being designed? What reciprocity arrangements exist between tracking systems, if any, and are discussions underway to encourage more reciprocity? What moves are underway to fill market "holes" where REC tracking systems do not yet exist? What should DOE do?***

- Morgan – support for development of regional tracking system by making data available and setting national protocol for how systems talk to each other.

- Walton – gradual development of tracking systems and then this year 2 new systems that cover the other half of the country; first the systems need to be set up and have RECs – need time to sort out the kinks. National coverage facilitated by default system to be launched by the end of the year.

- Helgeson – continue to have meetings like this to facilitate states talking to each other. Support for regional tracking systems; Seams – importing and exporting after the systems get up and running.

# APPENDIX D. BREAKOUT SESSIONS DISCUSSION

Two breakout sessions were conducted concurrently, to engage all participants in the workshop. Breakout session #1 focused on using RECs to support project financing and breakout session #2 focused on harmonizing REC programs and tracking systems to facilitate regional/national markets. The goals of these sessions were to reiterate and validate the key challenges identified in the morning, prioritize (to the extent possible) these challenges, identify potential activities to address the challenges, and identify specific activities that DOE could undertake. This section includes detailed notes from both breakout sessions.

## Breakout Session #1 – Using RECs to Support Project Financing

**Facilitator:** Beth Fascitelli, The Keystone Center
**Participants:**

1. Carrie Cullen-Hitt
2. Claude Boudrias
3. Ian Springsteel
4. Kevin Porter
5. Matt Clouse
6. Liz Salerno
7. Rachel Dugan
8. Sam Watson
9. Jeff Deyette
10. Chris Namovicz
11. Jim Torpey
12. Steve Lindenberg
13. Lori Bird
14. Jim Scarrow
15. Dan Birns
16. Joe Parella
17. Claire Broido Johnson
18. Charles Jennings
19. Karlynn Cory
20. Alex Perrara
21. Kevin Rackstraw
22. Elaine Sison-Lebrilla
23. Randy Manion
24. Andrew Spahn
25. Sam Watson
26. Kevin Kelly

**General Comments:**

- REC financing issues are different for RPS and voluntary markets. Answers are easier for RPS than for voluntary markets
- Long-term issues – perhaps unsolvable? Addressing short-term problems is more helpful
- Ability to site new projects was identified as another challenge missing from the list

### A – Lack of L-T contracts or forward market for RECs (high impact/low complexity)

***Challenges/Issues Discussion***

- **Buyers are not willing to buy long-term power**. Will they buy RECs long-term (L-T)?
- **Price not L-T contract is the problem.** No problem on L-T PPA, because there is money chasing the projects. Not enough certainty about REC prices being high enough to make the economics work. Can get fixed price contracts, just not at the right price to make the projects work.
- L-T REC contracts are happening in RPS market but **not in voluntary market**. In RPS markets it isn't a problem now, but was about a year ago.
- **Discounting RECs** to reflect uncertainty. Risk in out years is still high enough that financial institutions are discounting RECs in future years and consider the net present value (NPV) of REC prices. To increase value, need to minimize risk in out years.
- **L-T consumer demand uncertainty**. The only way to guarantee L-T price is buy-in from end-users for mandatory and voluntary markets. 1) Need to sell the concept of the

product to the American people 2) who do you want bearing the risk – ratepayer or financial entity?

- **Uncertainty creates opportunity**. Money is coming into the markets because they see arbitrage opportunity due to uncertainty, i.e. money to be made by buying low and selling high later. Just because L-T contracts are available doesn't mean that there is greater certainty.
- **Demand uncertainty** - Price difference depends on level of demand in RPS and voluntary markets, as well as fuel type and vintage or projects. Need better understanding of why some states have high REC values and others don't. Is it better to be highly liquid and visible?
- **Long-term contract price uncertainty** – will this price have value in 10 years?
- **State RPS policy uncertainty** - Lots of policies would work, but as long as the policy is uncertain, there is no way to have REC price certainty. Regulatory certainty and demand certainty have to become better and more consistent.
- **No difference between policy and market** – if people are willing to pay, they will. (e.g. Germany) U.S. uses tax incentives for renewables, but this is a tough way to get increased demand. Market and policy are both fragile, if you lose people's commitment.
- **Project developers will do it if profitable**, so how to use RECs to make project more profitable?

***Solutions/ Actions***

- **Unbundle electricity and RECs.** NY kept energy and RECs bundled with first auction; with second, unbundled so that projects could get longer contracts for power in the market and reduced the amount that NY paid. Encouraged L-T contracts.
- **Central procurement** -- State can issue an RFP for RECs, PPA or option contracts (e.g. NY)
- **Set a price floor** on a national basis ($10/REC)
- **Educate American people** to generate greater demand for renewables
- **Educate developers** so they understand incentives to make renewables more profitable
    - Incentives out there are being mined; maybe not the right ones
- **Allow multiple bids for different structures.** L-T contracts are good, but have to build in the flexibility to allow developers to bid in other markets if it is in their best interest.
- **Change siting rules**

***Role for DOE***

- **Education of public**; some are cynical that this will have impact, particularly under current administration. Not a big education campaign, but something more similar to EPA's Green Power Partners. This market transformation program is helping people get information so they can make an educated decision.
- **Central procurement** entity - DOE could run an auction for RECs the way NY does for those states that do not have RPS. DOE could buy them and resell them into the market. DOE and other government entities *are* buying RECs today. This isn't publicly talked about; they are the biggest purchaser of RECs.
- At least one participant thought there is **no role for DOE in long-term contracting and/or forward markets**. This is going to be a state issue
- **Identify best practices from states** – workshops to discuss more of these issues, MA options contracts

- **Promote the concept of a REC** as a tradable and verifiable market instrument to create credibility in the market and give banks greater comfort.
    - EPA Green Power?? Network does a lot on RECs and voluntary market.
    - Energy Star for RECs
- **DOE should continue to support renewable technologies R&D**. The market is looking at the low-hanging fruit of commercial technologies. Technology development is still key and R&D is needed – e.g. low-temperature geothermal

**C – Uncertainty in future REC prices**

***Challenges/Issues Discussion***

- **Low prices could be a solution to some and a problem to others**. Some developers do not want to harmonize REC tracking and RPS REC systems if it results in lower prices. The more barriers there are, the higher the prices. Others disagreed, stating it is in the developers' long-term interest to make sure that price goes down as fast as possible. High prices will limit number of market participants.
- **REC prices will always be a point of tension** between regulators who want low prices and developers who want to maximize return.
- **Demand uncertainty.** Demand is going to be increasing, as RPS targets increase. So fact is that uncertainty in future REC prices will continue.
- **Removing the barriers and constraints in state RPS policies**, **will not eliminate uncertainty.** Tracking isn't just for RPS; also for voluntary markets, so you can't solve the problems by changing RPS policies. State RPS is a negotiation.
- If an **RPS and tracking system were not synonymous**, this would help the voluntary market with credibility and help by limiting double counting.
- **The future cost of the technology** is likely to decline but is uncertain, particularly for solar. This makes it more difficult to construct 10 year contracts.

***Solutions/Actions***

- **Green-E certification requires tracking system.** Systems can track for voluntary markets, but don't really do so. They will in the future because Green-E will require this.
- **Provide better standards** for technical requirements, siting, etc. Insure that states with RFPs have a conventional standard for what they are looking for.
- **Standardize REC contracts**.
- **Provide system to verify bidder qualifications** to eliminate projects that are not real.
    - Challenge between being prescriptive (permits, etc.) and verifying projects
- **Develop and disseminate RPS best practices**, how RECs are commoditized, and historical evaluation of policies and markets. Market will adjust based on the information.
- **Siting backstop authority**

***Role for DOE***

- **Continue to provide resource assessments**– data from national lab or DOE contractor based on actual measurements. This information should be publicly available
- **Provide better and more consistent information about projects** under development and operating. Enhancing project database available from EIA.

**B – Lack of price transparency in S-T and L-T REC markets**

***Challenges/Issues***

- **Disagreement about the level of current price transparency**. Some think it is a problem because not everyone gets the Evolution Markets price information for free. Others said there is good price transparency on current year trades. Agreed that long-term price transparency is important and less prevalent.
- **Availability of bilateral contract prices also less prevalent**. EIA has collected some bilateral contract information because federal law requires this although funding does not support this mandate. Some states report this (NJ Solar REC market); in other states it is hard to find.
- **Price transparency could help small distributed REC market**, with lots of unsophisticated sellers and few, sophisticated buyers. Sellers are at a disadvantage.
- **Price transparency helps sellers** because it makes new projects more bankable
- **Market price discovery function is valuable**. Helps buyers justify the price currently paid for RECs. Can justify REC prices based on a bilateral contracts, but is inefficient.
- **Need a lot of data to support REC options**. Currently not available.
- Should REC markets emulate financial markets? Stock market has price transparency because there are protections and price must be reported. This is to protect individual buyers. Not the case in bond markets. RECS similar to bond markets, people left to their own devices to figure out the price.

***Solutions/Actions***

- **Make REC price and volume information publicly available**. Evolution Markets has provided info to the market place to help folks make decisions, but doesn't cover the whole market – bilateral deals. DOE or RTOs could offer some REC spot or forward market price transparency, similar to energy markets.
- **Need standardize 3 and 5-year products**. These standard products should be traded. Where there is a larger market, generate brokerage transaction fees
- **Need an Securities Exchange Commission for RECs?** Probably not. Perhaps have this be private but voluntary mechanism that is all inclusive?

***Role for DOE***

- **Collect, study, and record data** on resources and REC transactions to facilitate transparency.
- **Credible provider of market price information.** Others thought this was a role for RTO or independent entity.

**D. Difficulty tracking RECs (multiple markets, incomplete coverage – high impact, high complexity)**

***Challenges/Issues***

- Generally agreed that **tracking is *not* an issue for financing**. But greater consistency could help increase volumes and liquidity.
- **Transaction costs increase** when you go from one ISO to another and if there are deliverability requirements on an hourly basis. This increases the cost of selling that product.

- We don't count Hg, CO2, etc. as a detriment for a coal plant – might pay for some controls, etc. Therefore, emissions displaced should be counted for a renewable plant – but this is a difficult calculation.
- **Tracking systems can track more than just RPS**, e.g. emission allowances, environmental attributes, etc. but not a perceived need. In carbon market, have to track all emissions in order to set up a cap and set the policy. Likewise REC tracking should cover all emissions even if there isn't a trading system.
- WAPA and other consumer–owned utilities likely to not be included under RPS.

***Solutions/Actions***

- **Vehicle for national standardization** of products and tracking systems.
- If RECs are unbundled from MWh, we will need **ability to track all the different products.** This might help improve the financing for a project.

***Role for DOE***

- **Support national institution to have standardization** the products that will be used.
- **Work with consumer-owned utilities** through APPA and NRCA to discuss RPS coverage with the municipal utilities and coops -- promote green pricing programs. Coops and municipal utilities can implement a voluntary RPS through tags or energy. Education is needed.
- **Explore differences in tracking system capabilities** further
    - Convene workshops to discuss issues
    - Bring together tracking systems to discuss

**GENERAL SUMMARY – DOE roles**

- Information clearinghouse
- Convener for information exchange
- Convene dialogue for regional discussions
- Public education and awareness
- Central procurement for REC auction
- Technical and information assistance to policymakers
- Implement mandates given to them by Congressional mandates

## BREAKOUT SESSION #2: Harmonizing REC Programs and Tracking Systems to Facilitate Regional/National Markets

**Facilitator:** Catherine Morris, The Keystone Center
**Participants:**

1. Linda Silverman
2. Paul Douglas
3. John Pappas
4. Paul Helgeson
5. Charles Jennings
6. Larry Mansueti
7. John Sniffen
8. Tom Rawls
9. Jeff Bladen
10. Hampton Newsome
11. Meredith Wingate
12. Andrea Coon
13. Bob Grace
14. Carrie Plemons
15. Johanna Zetterberg
16. Rick Anderson
17. Niko Dietsch
18. Alexander Perera
19. Brian Rounds
20. Ed Holt
21. Devon Walton
22. Jeremy Weinstein
23. Dennis Duffy
24. Sara Kamins
25. John Atcheson
26. Jennifer DeCesaro
27. Andrew Kolchins
28. Ryan Wiser
29. Joe Kerecman
30. Linda Silverman
31. Howard Bernstein
32. Rick Morgan

**Challenges/Issues**: If goal is fungibility and liquidity in RECs, what are the challenges?

A. Lack of consistency in renewable eligibility
B. Lack of consistency in treatment of out-of-state generation
C. Lack of consistency in REC trading and compliance rules
D. REC tracking systems lack sufficient functionality to transfer RECs among regions
E. Holes in existing REC tracking systems (e.g. Southeast)

**General Comments**

- The discussion began with **clarification about terminology** and the meaning of the challenges listed on the handout.

- Participants agreed that we **need to recognize two distinct markets -- compliance and voluntary** -- when thinking about challenges. Each has overlapping and unique problems. In general, there was much stronger support for developing a national REC system for the voluntary market.

- One participant also asked the group to **distinguish between characteristics and derived attributes (benefits)** of RECs in the discussion.

- In addition to adding several other challenges (listed below) much of the discussion regarding challenges focused on the role of the tracking system to support a liquid REC market. Some of the comments were:

  - PJM: **PJM not currently a viable voluntary market to support REC tracking** infrastructure for voluntary market. Tracking systems funded and initially intended for compliance markets. Also**, need a standard product to trade**. RECs currently differ and are not standardized. Design standard national REC definition that can be retired in all markets. Functionality is there, just need to decide to do it and pay for it.

  - APX: **Tracking systems are not the problem**. Tracking systems can do whatever policymakers want/need.

- Sterling Planet: **Need to track all attributes**; can't do this via a paper trail. Voluntary market needs to be served and needs market credibility with tracking.
- NEPOOL GIS: Do not obviate state policy or objectives/designs of existing policies. **National tracking system ok for voluntary market, and not for state RPS**. State policies were designed differently for a reason.
- CA PUC: **Low priority for states to have national tracking system,** but may be useful for other parties.
- Retail Choice: **Need national tracking system for voluntary markets**; not possible for state RPS. For voluntary market, maybe this can be a simpler system than current systems. Commoditization of compliance RECs won't occur.

**Other Challenges/Issues**

- Interaction of RECs and carbon markets/other attribute markets
- Credibility of benefits claims, fraud
- Existing REC programs are not structured to support inter-regional transfer
- No policy or financing to support broader market
- Characteristics (all tracking systems) vs. benefits (derived attributes)
- No conversion mechanism
- National system needed for voluntary market

**Solutions**

The group did not specifically link solutions to problems or attempt to prioritize the problems. The list of possible activities that could address the challenges and who could take the lead include:

1. **Develop additional functionality in existing tracking systems for voluntary market** to allow RECs to trade across REC tracking boundaries outside of energy settlements and that allow voluntary retirement separate from compliance. (DOE)
2. **Create a standard REC definition and data fields/account structure** that is broad enough to serve both compliance and voluntary markets. All tracking systems, at minimum, should have data fields. But some wonder if this creates too many fields to track..( DOE)
3. **Continue to explore opportunities to close the gap between State RPS statutory requirements.** Some think that compliance uniformity is not likely and not politically viable. (DOE)
4. **Create a separate mechanism for benefits/allowance tracking.** Build on ABA/ACORE contract.
5. **Create equivalency among verification systems**. Develop minimum standards for generator verification and verification of characteristics included on RECs. (DOE)
6. **Establish a national generator verification system** - could involve auditing of random subset of generators to ensure that REC characteristics are accurate; no one is out there kicking the tires. Key additional needs are online date; generator fuel switching particularly with biomass fuels.

7. **Provide funding for audits and spot checks**. Disagreement on value and need for this, availability of existing data sources, versus using existing systems. Others do not want to pass authority to federal government. Need act on Congress to do this, because otherwise funding sources may not exist on on-going basis. (DOE)
8. **Explore implications of interaction between electricity REC and GHG markets** (DOE/EPA)
9. **Create a default system for areas without tracking systems** (DOE)
10. **Establish dialogue of national RPS** (NGA, NCSL)
11. **Work with non-RPS states to impart current experience and resources** (DOE, NREL)
12. **Focus on over-lax states / states that resist change**
13. **Continue to model and report on projected carbon markets** and prices (DOE/EIA)
14. **Develop estimation of benefits for liquid fuels**: carbon benefits and others. No one has yet taken leadership in this area. How to measure benefits? Who gets them, and therefore gets to make environmental claims? (WRI, 1605B)

**General Summary of DOE roles**

- Continue the multi-stakeholder dialogue on :
    1. standardizing RPS
    2. REC definitions
    3. renewable fuels
    4. default tracking system
    5. national tracking system for voluntary markets
    6. interactions between REC and GHG markets
- Aggregate and disseminate best practices; disseminate to non-RPS states
- Standardize/fund national REC verification system